PATENT
Attorney Docket No. 401573/SOGA

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

HATTORI et al.

Application No. Unassigned

Art Unit: Unassigned

Examiner: Unassigned

Filed: February 15, 2002

For: STATE-OF-DEVICE REMOTE MONITOR SYSTEM

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Prior to the examination of the above-identified patent application, please enter the following amendments and consider the following remarks.

IN THE TITLE:

Replace the title with:

STATE-OF-DEVICE REMOTE MONITORING SYSTEM

IN THE DRAWINGS:

The Examiner is requested to approve the changes to Figures 2, 13, 15, 17, and 19 as indicated in the attached Request for Approval of Drawing Amendments.

IN THE SPECIFICATION:

Replace the paragraph beginning at page 1, line 13:

In a large-scale plant such as a power plant, water treatment plant, etc., which often use electric motors, if something abnormal is detected by monitoring a device state of the electric motor, a generator, or a transformer installed in the plant, it is important in terms of reliability of the plant and enhancing operating ratio to obtain details of this abnormality.

Replace the paragraph beginning at page 2, line 2:

Further, this type of state-of-device remote monitor system that targets not only the mechanical and electrical equipment, such as electric motors, generators, pumps, valves, and pipes, but also measuring devices for a calculator and a substrate, has been accelerated in its development and is at a stage of being introduced. The state-of-device remote monitor system, as compared with the conventional method in which an operator patrols inside the plant and observes the devices, is classified based on its usage into a system that measures the data of a target device periodically or arbitrarily and observes the state of the device when measured, and a system that measures the state of the target device on-line at all times and continuously monitors its state.

IN THE CLAIMS:

Replace the indicated claims with:

1. (Amended) A state-of-device remote monitoring system comprising:
an on-the-spot area; and
a management area,
said on-the-spot area including:
an electric device;
a detector for detecting a device state of said electric device;
a first communication signal converter for converting detection data obtained by detection of said detector into communication signals, and transmitting the communication signals; and
a controller, having a memory for storing the detection data obtained by the detection of said detector, for storing with the detection data the device state based on a preset detection start program, and outputting the detection data stored in said memory to said first communication signal converter based on a preset communication start program that runs in correspondence with storage of the detection data, and
said management area including:
a second communication signal converter for converting the communication signals received from said first communication signal converter into the detection data before;
a maintenance tool having a diagnostic/analytic program for analyzing the

device state from the detection data converted by said second communication signal converter, and a maintenance database storing data necessary for analysis by said diagnostic/analytic program and a diagnosed result; and

a display unit for displaying the diagnosed result obtained by the analysis by said maintenance tool.

2. (Amended) The state-of-device remote monitoring system according to claim 1, further comprising a general purpose network for transmitting the communication signals transmitted from said first communication signal converter to said second communication signal converter.

3. (Amended) The state-of-device remote monitoring system according to claim 1, wherein

said first communication signal converter converts the detection data into radio signals and transmits the radio signals, and

said second communication signal converter converts the radio signals received from said first communication signal converter into the detection data.

4. (Amended) The state-of-device remote monitor system according to claim 2, wherein

said on-the-spot area includes a mobile communication device for transmitting the radio signals based on the communication signals converted by said first communication signal converter, and

said general-purpose network includes:

at least one base station for receiving the radio signals of said mobile communication device and converting the radio signals into the communication signals; and

a mobile communication network for transferring the communication signals converted by said base station to a public line network.

5. (Amended) The state-of-device remote monitoring system according to claim 1, further comprising:

a power line for supplying said electric device with electric power from a power source device; and

connecting means for connecting said power line, said controller, and said first communication signal converter to each other, said controller transmitting the detection data to said first communication signal converter via said connecting means and said power line.

6. (Amended) The state-of-device remote monitoring system according to claim 5, further comprising:

a current transformer, provided on said power line, for taking an electric current in a non-contact manner from said power line; and

a power source circuit for supplying the electric power to said controller based on the current taken by said current transformer.

7. (Amended) The state-of-device remote monitoring system according to claim 1, wherein when said on-the-spot area is within a train including a train radio device for adjusting a traffic schedule, the detection data stored in said memory are wirelessly transmitted to said second communication signal converter from said train radio device by use of said train radio device as said first communication signal converter.

8. (Amended) The state-of-device remote monitoring system according to claim 2, wherein, if said on-the-spot area is within an automobile, comprising:

a mobile record terminal downloaded with the detection data stored in said memory by connecting a communication cable, disconnectable from and connectable to said first communication signal converter; and

a mobile communication device, connected to said mobile record terminal, for converting the detection data downloaded into said mobile record terminal into the radio signals and transmitting the radio signals, wherein said general-purpose network includes at least one base station for receiving and converting the radio signals of said mobile communication device into the communication signals, and including

a mobile communication network for transferring the communication signals converted by said base station to a public line network.

9. (Amended) The state-of-device remote monitoring system according to claim 1, wherein, when said on-the-spot area is within an electric car including a battery for supplying electric power, the system comprises:

a power source/communication cable disconnectable from and connectable to said battery, connected to a power source; and

a power control device for charging said battery with electricity from said power source device by connecting said power source/communication cable to said battery, downloading the detection data stored in said memory, and transferring the detection data to said general-purpose network.

10. (Amended) The state-of-device remote monitoring system according to claim 2, wherein said controller does not include said memory, detects a device state through said

detector based on a preset detection start program if a communication route between said first communication signal converter and said general-purpose network is established, and outputs the detection data to said first communication signal converter based on a preset communication start program in accordance with the device state detected.

11. (Amended) The state-of-device remote monitoring system according to claim 1, wherein

said maintenance tool outputs a state-of-device detection start command of the electric device to said controller at a predetermined time, and

said controller executes the detection start program based on the state-of-device detection start command.

12. (Amended) The state-of-device remote monitoring system according to claim 1, wherein

if said controller detects the device state through said detector with a fixed period, said maintenance tool outputs to said controller a command to change detection period of said detector in accordance with a diagnosed result from the detection data based on a preset program, and

said controller detects the detection data from said detector with the detection period changed, based on the command to change the detection period.

13. (Amended) The state-of-device remote monitoring system according to claim 1, further comprising a mobile communication device for issuing abnormality information upon receiving the abnormality information, wherein said maintenance tool transmits, if the diagnosed result from the detection data shows an abnormality, the abnormality information to said mobile communication device.

14. (Amended) The state-of-device remote monitoring system according to claim 13, wherein said maintenance tool includes a maintenance procedure database storing maintenance procedure data corresponding to a variety of abnormal states, extracts the maintenance procedure data corresponding to the abnormal information from said maintenance procedure database if the diagnosed result from the detection data shows the abnormality, and transmits the extracted maintenance procedure data together with the abnormality information to said mobile communication device.

15. (Amended) The state-of-device remote monitoring system according to claim 1, further comprising a user maintenance terminal connected to said general-purpose network and issuing the data received via said general-purpose network, wherein said maintenance

tool is managed by an in-charge-of-maintenance company in charge of monitoring device state of the electric device and outputting the diagnosed result, based on said diagnostic/analytic program, to said maintenance terminal.

16. (Amended) The state-of-device remote monitoring system according to claim 15, wherein said maintenance tool includes a device database storing device specifications of a variety of electric devices, and a maintenance procedure database storing maintenance procedure data corresponding to a variety of abnormal states, and outputs to said maintenance terminal the device specification corresponding to an electric device analyzed and the maintenance procedure data corresponding to the diagnosed result together with the diagnosed result based on said diagnostic/analytic program.

17. (Amended) The state-of-device remote monitoring system according to claim 15, wherein

said mobile communication device is possessed by a maintenance worker of the in-charge-of-maintenance company in charge of monitoring the device state of the electric device,

said maintenance tool is managed by the in-charge-of-maintenance company and includes:

a position database storing position of said mobile communication device; and

a maintenance worker invoked program for extracting, if the diagnosed result based on said diagnostic/analytic program shows the abnormality, said mobile communication device closest in position to the electric device diagnosed abnormal, based on said position database, and calling said mobile communication device.

18. (Amended) The state-of-device remote monitoring system according to claim 17, wherein

said maintenance tool includes a device database storing device specifications of a variety of electric devices, and a maintenance procedure database storing plural items of maintenance procedure data corresponding to a variety of abnormal states, and

said maintenance worker invoked program calls said mobile communication device and provides said mobile communication device for the maintenance worker with the device specifications corresponding to the electric device diagnosed abnormal and the maintenance procedure data corresponding to the abnormal state.

IN THE ABSTRACT:

Replace the Abstract with:

ABSTRACT OF THE DISCLOSURE

A state-of -device remote monitoring system using a general-purpose line as a transmission line for transmitting detection signals disclosing the state of a device, includes an on-the spot area, and a management area. The on-the-spot area includes an electric device, a detector for detecting a device state of the electric device, and a first communication signal converter for converting detection data obtained by the detector into communication signals, and transmitting the communication signals. The management area includes a second communication signal converter for converting the communication signals received from the first communication signal converter into the detection data, a maintenance tool having a diagnostic/analytic program for analyzing the device state from the detection data converted by the second communication signal converter, and a maintenance database data necessary for the analysis by the diagnostic/analytic program and a diagnosed result, and a display unit for displaying the diagnosed result obtained from the analysis by the maintenance tool.

REMARKS

The foregoing Amendment corrects translational errors and conforms the claims to United States practice. No new matter is added.

Respectfully submitted,

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AMENDMENTS TO SPECIFICATION, CLAIMS AND ABSTRACT MADE VIA PRELIMINARY AMENDMENT

Amendments to the paragraph beginning at page 1, line 13:

In a large-scale plant such as a power plant, water treatment ~~equipment~~ plant, etc., which ~~use~~ often ~~the~~ use electric motors, if something abnormal is detected by monitoring a device state of the electric motor, a generator ~~and~~, or a transformer installed in the plant, it is ~~of importance~~ important in terms of ~~ensuring a~~ reliability of the plant and enhancing ~~an~~ operating ratio to ~~presume~~ obtain details of this abnormality.

Amendments to the paragraph beginning at page 2, line 2:

Further, this type of state-of-device remote monitor system that targets not only the mechanical and electrical equipment, such as ~~the~~ electric ~~motor, the generator, a pump, a valve and a pipe~~ motors, generators, pumps, valves, and pipes, but also measuring devices for a calculator and a substrate, ~~is~~ has been accelerated in its development and is at a stage of being introduced. The state-of-device remote monitor system ~~is~~, as compared with the conventional method in which an operator patrols inside the plant and observes the devices, is classified based on its usage into a system that measures the data of a target device periodically or arbitrarily and observes the state of the device when measured, and a system that measures the state of the target device ~~online~~ on-line at all times and ~~ever~~ continuously monitors its state.

Amendments to existing claims:

1. (Amended) A state-of-device remote ~~monitor~~ monitoring system comprising:

an on-the-spot area; and

a management area,

said on-the-spot area including:

an electric device;

a detector for detecting a device state of said electric device;

a first communication signal converter for converting detection data obtained by ~~the~~ detection of said detector into communication signals, and transmitting the communication signals; and

a controller, having a memory for storing the detection data obtained by the detection of said detector, for storing ~~said memory~~ with the detection data ~~obtained by detecting~~ the device state ~~with said detector~~ based on ~~the basis of~~ a preset detection start program, and outputting the detection data stored in said memory to said first communication signal converter based on ~~the basis of~~ a preset communication start program that runs ~~corresponding to a~~ in correspondence with storage of the ~~predetermined~~ detection data, and

said management area including:

a second communication signal converter for converting the communication signals received from said first communication signal converter into the detection data before ~~being converted by said first communication signal converter~~;

a maintenance tool having a diagnostic/analytic program for analyzing the device state from the detection data converted by said second communication signal converter, and a maintenance database ~~stored with~~ storing data necessary for ~~the~~ analysis by said diagnostic/analytic program and a diagnosed result; and

a display unit for displaying the diagnosed result obtained by the analysis by said maintenance tool.

2. (Amended) ~~A~~ The state-of-device remote ~~monitor~~ monitoring system according to claim 1, further comprising a general- purpose network for transmitting the communication signals transmitted from said first communication signal converter to said second communication signal converter.

3. (Amended) ~~A~~ The state-of-device remote ~~monitor~~ monitoring system according to claim 1, wherein

said first communication signal converter converts the detection data into radio signals and transmits the radio signals, and

said second communication signal converter converts the radio signals received from said first communication signal converter into the detection data ~~before being converted by said first communication signal converter~~.

4. (Amended) ~~A~~ The state-of-device remote monitor system according to claim 2, wherein

said on-the-spot area includes a mobile communication device for transmitting the radio signals based ~~on the basis of~~ the communication signals converted by said first communication signal converter, and

said general-purpose network includes~~:~~

at least ~~a~~ one base station for receiving the radio signals of said mobile communication device and converting the radio signals into the communication signals; and

a mobile communication network for transferring the communication signals converted by said base station to a public line network.

5. (Amended) ~~A~~ The state-of-device remote ~~monitor~~ monitoring system according to claim 1, further comprising:

a power line for supplying said electric device with electric power from a power source device; and

connecting means for connecting said power line, said controller, and said first communication signal converter to each other, said controller ~~transmits~~ transmitting the detection data to said first communication signal converter via said connecting means and said power line.

6. (Amended) ~~A~~ The state-of-device remote ~~monitor~~ monitoring system according to claim 5, further comprising:

a current transformer, provided on said power line, for taking an electric current in a non-contact manner from ~~within~~ said power line; and

a power source circuit for supplying the electric power to said controller based on the ~~basis of the~~ current taken ~~out~~ by said current transformer.

7. (Amended) ~~A~~ The state-of-device remote ~~monitor~~ monitoring system according to claim 1, wherein when said on-the-spot area is within a train ~~mounted with~~ including a train radio device for adjusting a traffic schedule, the detection data stored in said memory are wirelessly transmitted to said second communication signal converter from said train radio device by use of said train radio device as said first communication signal converter.

8. (Amended) ~~A~~ The state-of-device remote~~-monitor~~ monitoring system according to claim 2, ~~further~~ wherein, if said on-the-spot area is within an automobile, comprising:

a mobile record terminal downloaded with the detection data stored in said memory by connecting a communication cable, disconnectable from and connectable to said first communication signal converter; and

a mobile communication device, connected to said mobile record terminal, for converting the detection data downloaded into said mobile record terminal into the radio signals and transmitting the radio signals, wherein said general-purpose network~~-including~~ includes at least ~~a~~ one base station for receiving and converting the radio signals of said mobile communication device into the communication signals~~,~~, and including

a mobile communication network for transferring the communication signals converted by said base station to a public line network.

9. (Amended) ~~A~~ The state-of-device remote~~-monitor~~ monitoring system according to claim 1, ~~further~~ wherein, ~~if~~ when said on-the-spot area is within an electric car~~-mounted with~~ including a battery for supplying ~~the~~ electric power, ~~comprising~~ the system comprises:

a power source/communication cable disconnectable from and connectable to said battery, connected to a power source; and

a power control device for charging said battery with ~~the~~ electricity from said power source device by connecting said power source/communication cable to said battery, downloading ~~with~~ the detection data stored in said memory, and transferring the detection data to said general-purpose network.

10. (Amended) ~~A~~ The state-of-device remote~~-monitor~~ monitoring system according to claim 2, wherein said controller does not include said memory, detects a device state ~~trough~~ through said detector based on ~~the basis of~~ a preset detection start program if a communication route between said first communication signal converter and said general-purpose network is established, and outputs the detection data to said first communication signal converter based on ~~the basis of~~ a preset communication start program in accordance with the ~~detection~~ device state detected.

11. (Amended) ~~A~~ The state-of-device remote~~-monitor~~ monitoring system according to claim 1, wherein

said maintenance tool outputs a state-of-device detection start command of the electric device to said controller at a predetermined time, and

said controller executes the detection start program based on ~~the basis of~~ the state-of-device detection start command.

12. (Amended) ~~A~~ The state-of-device remote~~-monitor~~ monitoring system according to claim 1, wherein

if said controller detects the device state through said detector with a fixed period, said maintenance tool outputs to said controller a command to change~~-the~~ detection period of said detector in accordance with a diagnosed result from the detection data based on~~-the basis of~~ a preset program, and

said controller detects the detection data from said detector with the detection period changed, based on the command to change the detection period~~-change command~~.

13. (Amended) ~~A~~ The state-of-device remote~~-monitor~~ monitoring system according to claim 1, further comprising a mobile communication device for issuing~~-a piece of~~ abnormality information upon receiving the~~-same~~ abnormality information, wherein said maintenance tool ~~transmitting~~ transmits, if the diagnosed result from the detection data shows ~~the~~ an abnormality, the abnormality information to said mobile communication device.

14. (Amended) ~~A~~ The state-of-device remote~~-monitor~~ monitoring system according to claim 13, wherein said maintenance tool includes a maintenance procedure database~~-stored beforehand with plural items of~~ storing maintenance procedure data corresponding to a variety of abnormal states, extracts the maintenance procedure data corresponding to the abnormal information from said maintenance procedure database if the diagnosed result from the detection data shows the abnormality, and transmits the extracted maintenance procedure data together with the~~-abnormal~~ abnormality information to said mobile communication device.

15. (Amended) ~~A~~ The state-of-device remote~~-monitor~~ monitoring system according to claim 1, further comprising ~~a user's own~~ user maintenance terminal connected to said general-purpose network and issuing the data received via said general-purpose network, wherein said maintenance tool~~-being~~ is managed by an in-charge-of-maintenance company in charge of monitoring~~-a~~ device state of the electric device and outputting the diagnosed result, based on said diagnostic/analytic program, to said maintenance terminal.

16. (Amended) ~~A~~ The state-of-device remote~~-monitor~~ monitoring system according to claim 15, wherein said maintenance tool includes a device database~~-stored beforehand with~~ storing device specifications of a variety of electric devices, and a maintenance procedure database ~~stored beforehand with plural items of~~ storing maintenance procedure data corresponding to ~~the~~ a variety of abnormal states, and outputs to said maintenance terminal the device specification corresponding to~~-the analyzed~~ an electric device analyzed and the

maintenance ~~procedures~~ procedure data corresponding to the diagnosed result together with the diagnosed result based on said diagnostic/analytic program.

17. (Amended) ~~A~~ The state-of-device remote~~-monitor~~ monitoring system according to claim ~~13~~ 15, wherein

said mobile communication device is~~-owned~~ possessed by a maintenance worker of the in-charge-of-maintenance company in charge of monitoring the device state of the electric device,

said maintenance tool is managed by the in-charge-of-maintenance company and includes:

a position database~~-stored with~~ storing position~~-data~~ of said mobile communication device; and

a maintenance worker~~-invoke~~ invoked program for extracting, if the diagnosed result based on said diagnostic/analytic program shows the abnormality, said mobile communication device~~-proximal~~ closest in position to the electric device diagnosed abnormal~~-from~~, based on said position database, and calling~~-up~~ said mobile communication device.

18. (Amended) ~~A~~ The state-of-device remote~~-monitor~~ monitoring system according to claim 17, wherein

said maintenance tool includes a device database~~-stored beforehand with~~ storing device specifications of a variety of electric devices, and a maintenance procedure database ~~stored beforehand with~~ storing plural items of maintenance procedure data corresponding to ~~the~~ a variety of abnormal states, and

said maintenance worker~~-invoke~~ invoked program calls~~-up~~ said mobile communication device and provides said mobile communication device for the maintenance worker with the device specifications corresponding to the electric device diagnosed abnormal and the maintenance~~-procedures~~ procedure data corresponding to the~~-monitored result~~ abnormal state.

Amendments to the abstract:

ABSTRACT OF THE DISCLOSURE

A state-of -device remote~~-monitor~~ monitoring system~~-capable of applying~~ using a general-purpose line as a transmission line for transmitting detection signals~~-of a~~ disclosing the state of a device,~~-comprises~~ includes an on-the spot area, and a management area. The on-the-spot area includes an electric device, a detector for detecting a device state of the electric device, and a first communication signal converter for converting detection data

obtained by ~~the detection of~~ the detector into communication signals, and transmitting the communication signals. The management area includes a second communication signal converter for converting the communication signals received from the first communication signal converter into the detection data ~~before being converted by the first communication signal converter~~, a maintenance tool having a diagnostic/analytic program for analyzing the device state from the detection data converted by the second communication signal converter, and a maintenance database ~~stored with~~ data necessary for the analysis by the diagnostic/analytic program and a diagnosed result, and a display unit for displaying the diagnosed result obtained ~~by~~ from the analysis by the maintenance tool.

Serial No. 09/727,290

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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HATTORI et al.

Art Unit: Unassigned

Application No. Unassigned

Examiner: Unassigned

Filed: February 15, 2002

For: STATE-OF-DEVICE REMOTE MONITOR SYSTEM

PENDING CLAIMS AFTER ENTRY OF PRELIMINARY AMENDMENT

1. A state-of-device remote monitoring system comprising:

an on-the-spot area; and

a management area,

said on-the-spot area including:

an electric device;

a detector for detecting a device state of said electric device;

a first communication signal converter for converting detection data obtained by detection of said detector into communication signals, and transmitting the communication signals; and

a controller, having a memory for storing the detection data obtained by the detection of said detector, for storing with the detection data the device state based on a preset detection start program, and outputting the detection data stored in said memory to said first communication signal converter based on a preset communication start program that runs in correspondence with storage of the detection data, and

said management area including:

a second communication signal converter for converting the communication signals received from said first communication signal converter into the detection data before;

a maintenance tool having a diagnostic/analytic program for analyzing the device state from the detection data converted by said second communication signal converter, and a maintenance database storing data necessary for analysis by said diagnostic/analytic program and a diagnosed result; and

a display unit for displaying the diagnosed result obtained by the analysis by said maintenance tool.

2. The state-of-device remote monitoring system according to claim 1, further comprising a general purpose network for transmitting the communication signals transmitted from said first communication signal converter to said second communication signal converter.

3. The state-of-device remote monitoring system according to claim 1, wherein

said first communication signal converter converts the detection data into radio signals and transmits the radio signals, and

said second communication signal converter converts the radio signals received from said first communication signal converter into the detection data.

4. The state-of-device remote monitor system according to claim 2, wherein

said on-the-spot area includes a mobile communication device for transmitting the radio signals based on the communication signals converted by said first communication signal converter, and

said general-purpose network includes:

at least one base station for receiving the radio signals of said mobile communication device and converting the radio signals into the communication signals; and

a mobile communication network for transferring the communication signals converted by said base station to a public line network.

5. The state-of-device remote monitoring system according to claim 1, further comprising:

a power line for supplying said electric device with electric power from a power source device; and

connecting means for connecting said power line, said controller, and said first communication signal converter to each other, said controller transmitting the detection data to said first communication signal converter via said connecting means and said power line.

6. The state-of-device remote monitoring system according to claim 5, further comprising:

a current transformer, provided on said power line, for taking an electric current in a non-contact manner from said power line; and

a power source circuit for supplying the electric power to said controller based on the current taken by said current transformer.

7. The state-of-device remote monitoring system according to claim 1, wherein when said on-the-spot area is within a train including a train radio device for adjusting a traffic

schedule, the detection data stored in said memory are wirelessly transmitted to said second communication signal converter from said train radio device by use of said train radio device as said first communication signal converter.

8. The state-of-device remote monitoring system according to claim 2, wherein, if said on-the-spot area is within an automobile, comprising:

a mobile record terminal downloaded with the detection data stored in said memory by connecting a communication cable, disconnectable from and connectable to said first communication signal converter; and

a mobile communication device, connected to said mobile record terminal, for converting the detection data downloaded into said mobile record terminal into the radio signals and transmitting the radio signals, wherein said general-purpose network includes at least one base station for receiving and converting the radio signals of said mobile communication device into the communication signals, and including

a mobile communication network for transferring the communication signals converted by said base station to a public line network.

9. The state-of-device remote monitoring system according to claim 1, wherein, when said on-the-spot area is within an electric car including a battery for supplying electric power, the system comprises:

a power source/communication cable disconnectable from and connectable to said battery, connected to a power source; and

a power control device for charging said battery with electricity from said power source device by connecting said power source/communication cable to said battery, downloading the detection data stored in said memory, and transferring the detection data to said general-purpose network.

10. The state-of-device remote monitoring system according to claim 2, wherein said controller does not include said memory, detects a device state through said detector based on a preset detection start program if a communication route between said first communication signal converter and said general-purpose network is established, and outputs the detection data to said first communication signal converter based on a preset communication start program in accordance with the device state detected.

11. The state-of-device remote monitoring system according to claim 1, wherein

said maintenance tool outputs a state-of-device detection start command of the electric device to said controller at a predetermined time, and

said controller executes the detection start program based on the state-of-device detection start command.

12. The state-of-device remote monitoring system according to claim 1, wherein

if said controller detects the device state through said detector with a fixed period, said maintenance tool outputs to said controller a command to change detection period of said detector in accordance with a diagnosed result from the detection data based on a preset program, and

said controller detects the detection data from said detector with the detection period changed, based on the command to change the detection period.

13. The state-of-device remote monitoring system according to claim 1, further comprising a mobile communication device for issuing abnormality information upon receiving the abnormality information, wherein said maintenance tool transmits, if the diagnosed result from the detection data shows an abnormality, the abnormality information to said mobile communication device.

14. The state-of-device remote monitoring system according to claim 13, wherein said maintenance tool includes a maintenance procedure database storing maintenance procedure data corresponding to a variety of abnormal states, extracts the maintenance procedure data corresponding to the abnormal information from said maintenance procedure database if the diagnosed result from the detection data shows the abnormality, and transmits the extracted maintenance procedure data together with the abnormality information to said mobile communication device.

15. The state-of-device remote monitoring system according to claim 1, further comprising a user maintenance terminal connected to said general-purpose network and issuing the data received via said general-purpose network, wherein said maintenance tool is managed by an in-charge-of-maintenance company in charge of monitoring device state of the electric device and outputting the diagnosed result, based on said diagnostic/analytic program, to said maintenance terminal.

16. The state-of-device remote monitoring system according to claim 15, wherein said maintenance tool includes a device database storing device specifications of a variety of electric devices, and a maintenance procedure database storing maintenance procedure data corresponding to a variety of abnormal states, and outputs to said maintenance terminal the device specification corresponding to an electric device analyzed and the maintenance

procedure data corresponding to the diagnosed result together with the diagnosed result based on said diagnostic/analytic program.

17. The state-of-device remote monitoring system according to claim 15, wherein

said mobile communication device is possessed by a maintenance worker of the in-charge-of-maintenance company in charge of monitoring the device state of the electric device,

said maintenance tool is managed by the in-charge-of-maintenance company and includes:

a position database storing position of said mobile communication device; and

a maintenance worker invoked program for extracting, if the diagnosed result based on said diagnostic/analytic program shows the abnormality, said mobile communication device closest in position to the electric device diagnosed abnormal, based on said position database, and calling said mobile communication device.

18. The state-of-device remote monitoring system according to claim 17, wherein

said maintenance tool includes a device database storing device specifications of a variety of electric devices, and a maintenance procedure database storing plural items of maintenance procedure data corresponding to a variety of abnormal states, and

said maintenance worker invoked program calls said mobile communication device and provides said mobile communication device for the maintenance worker with the device specifications corresponding to the electric device diagnosed abnormal and the maintenance procedure data corresponding to the abnormal state.

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REQUEST FOR APPROVAL OF CHANGES TO THE DRAWINGS

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

The Examiner is requested to approve the changes to Figures 2, 13, 15, 17, and 19, as shown in red on the attached sheets of drawings.

Respectfully submitted,

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JAW:ves

FIG. 2

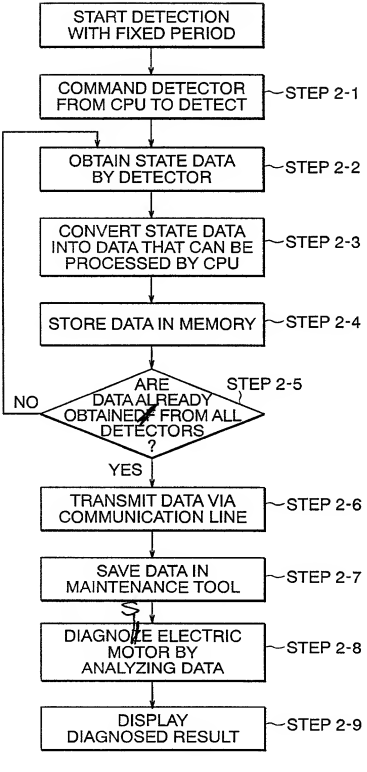

START DETECTION WITH FIXED PERIOD
COMMAND DETECTOR FROM CPU TO DETECT
STEP 2-1
OBTAIN STATE DATA BY DETECTOR
STEP 2-2
CONVERT STATE DATA INTO DATA THAT CAN BE PROCESSED BY CPU
STEP 2-3
STORE DATA IN MEMORY
STEP 2-4
ARE DATA ALREADY OBTAINED FROM ALL DETECTORS ?
STEP 2-5
NO
YES
TRANSMIT DATA VIA COMMUNICATION LINE
STEP 2-6
SAVE DATA IN MAINTENANCE TOOL
STEP 2-7
DIAGNOSE ELECTRIC MOTOR BY ANALYZING DATA
STEP 2-8
DISPLAY DIAGNOSED RESULT
STEP 2-9

FIG. 13

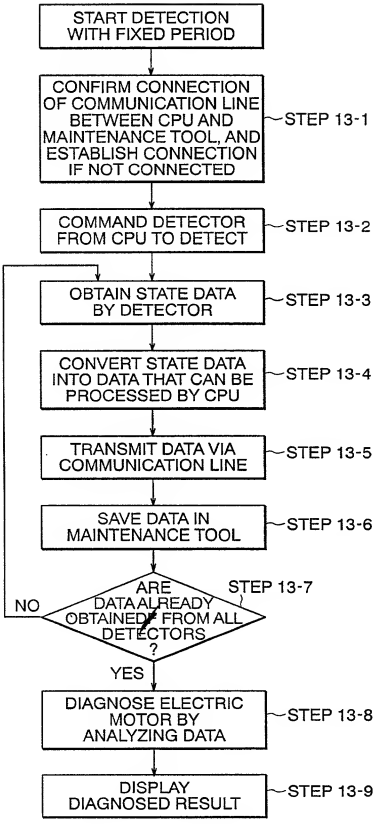

START DETECTION WITH FIXED PERIOD
CONFIRM CONNECTION OF COMMUNICATION LINE BETWEEN CPU AND MAINTENANCE TOOL, AND ESTABLISH CONNECTION IF NOT CONNECTED
STEP 13-1
COMMAND DETECTOR FROM CPU TO DETECT
STEP 13-2
OBTAIN STATE DATA BY DETECTOR
STEP 13-3
CONVERT STATE DATA INTO DATA THAT CAN BE PROCESSED BY CPU
STEP 13-4
TRANSMIT DATA VIA COMMUNICATION LINE
STEP 13-5
SAVE DATA IN MAINTENANCE TOOL
STEP 13-6
ARE DATA ALREADY OBTAINED FROM ALL DETECTORS ?
STEP 13-7
NO
YES
DIAGNOSE ELECTRIC MOTOR BY ANALYZING DATA
STEP 13-8
DISPLAY DIAGNOSED RESULT
STEP 13-9

FIG. 15

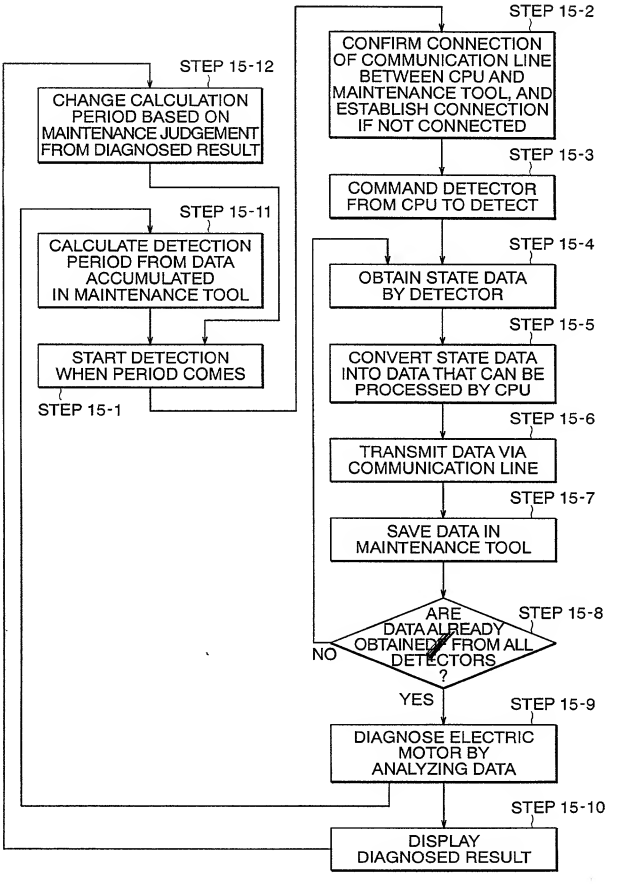

STEP 15-2
CONFIRM CONNECTION OF COMMUNICATION LINE BETWEEN CPU AND MAINTENANCE TOOL, AND ESTABLISH CONNECTION IF NOT CONNECTED
STEP 15-3
COMMAND DETECTOR FROM CPU TO DETECT
STEP 15-4
OBTAIN STATE DATA BY DETECTOR
STEP 15-5
CONVERT STATE DATA INTO DATA THAT CAN BE PROCESSED BY CPU
STEP 15-6
TRANSMIT DATA VIA COMMUNICATION LINE
STEP 15-7
SAVE DATA IN MAINTENANCE TOOL
STEP 15-8
ARE DATA ALREADY OBTAINED FROM ALL DETECTORS ?
NO
YES
STEP 15-9
DIAGNOSE ELECTRIC MOTOR BY ANALYZING DATA
STEP 15-10
DISPLAY DIAGNOSED RESULT
STEP 15-12
CHANGE CALCULATION PERIOD BASED ON MAINTENANCE JUDGEMENT FROM DIAGNOSED RESULT
STEP 15-11
CALCULATE DETECTION PERIOD FROM DATA ACCUMULATED IN MAINTENANCE TOOL
START DETECTION WHEN PERIOD COMES
STEP 15-1

FIG. 17

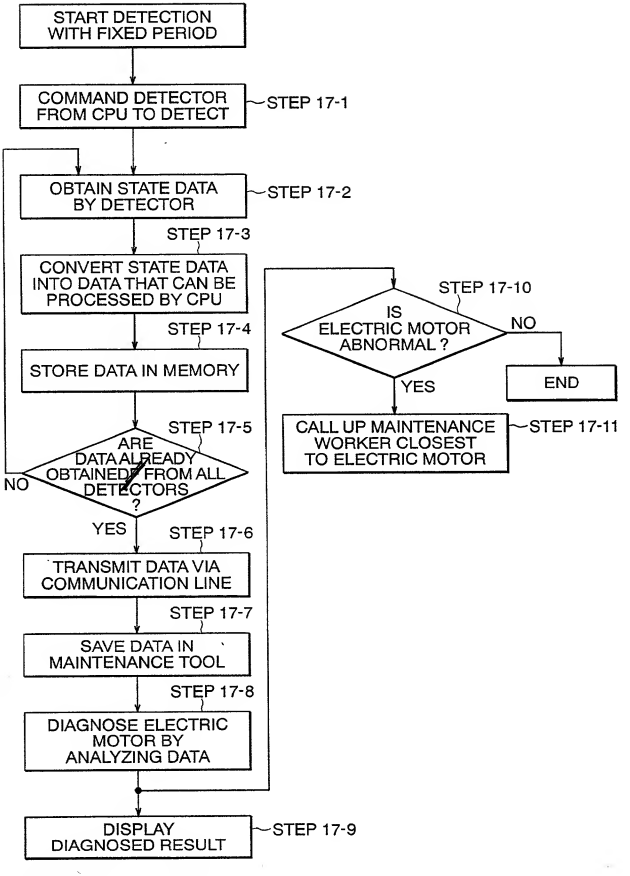
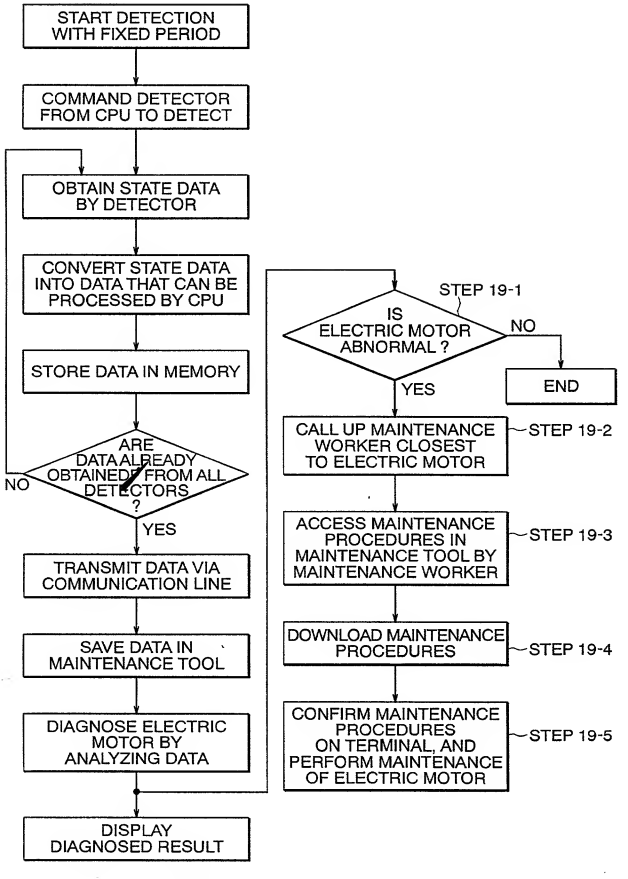

START DETECTION WITH FIXED PERIOD
COMMAND DETECTOR FROM CPU TO DETECT
STEP 17-1
OBTAIN STATE DATA BY DETECTOR
STEP 17-2
STEP 17-3
CONVERT STATE DATA INTO DATA THAT CAN BE PROCESSED BY CPU
STEP 17-4
STORE DATA IN MEMORY
STEP 17-5
ARE DATA ALREADY OBTAINED FROM ALL DETECTORS ?
NO
YES
STEP 17-6
TRANSMIT DATA VIA COMMUNICATION LINE
STEP 17-7
SAVE DATA IN MAINTENANCE TOOL
STEP 17-8
DIAGNOSE ELECTRIC MOTOR BY ANALYZING DATA
DISPLAY DIAGNOSED RESULT
STEP 17-9
STEP 17-10
IS ELECTRIC MOTOR ABNORMAL ?
NO
YES
END
CALL UP MAINTENANCE WORKER CLOSEST TO ELECTRIC MOTOR
STEP 17-11

FIG. 19


START DETECTION WITH FIXED PERIOD
COMMAND DETECTOR FROM CPU TO DETECT
OBTAIN STATE DATA BY DETECTOR
CONVERT STATE DATA INTO DATA THAT CAN BE PROCESSED BY CPU
STORE DATA IN MEMORY
ARE DATA ALREADY OBTAINED FROM ALL DETECTORS ?
NO
YES
TRANSMIT DATA VIA COMMUNICATION LINE
SAVE DATA IN MAINTENANCE TOOL
DIAGNOSE ELECTRIC MOTOR BY ANALYZING DATA
DISPLAY DIAGNOSED RESULT
STEP 19-1
IS ELECTRIC MOTOR ABNORMAL ?
NO
YES
END
CALL UP MAINTENANCE WORKER CLOSEST TO ELECTRIC MOTOR
STEP 19-2
ACCESS MAINTENANCE PROCEDURES IN MAINTENANCE TOOL BY MAINTENANCE WORKER
STEP 19-3
DOWNLOAD MAINTENANCE PROCEDURES
STEP 19-4
CONFIRM MAINTENANCE PROCEDURES ON TERMINAL, AND PERFORM MAINTENANCE OF ELECTRIC MOTOR
STEP 19-5